

# SWFR X4

Very-thin-wall, highly flame-retardant, zero halogen, metric-sized heat-shrinkable tubing

SWFR X4 heat-shrinkable tubing is a cost-effective, environmentally friendly choice for many commercial applications. SWFR X4 tubing is a very-thin-wall version of SWFR, a specially formulated polyolefin with low recovery temperature, excellent flexibility, and high flame-retardance (VW-1).

SWFR X4 tubing is typically applied where space savings is important, offering the ability to pack components more closely than is possible with standard tubings. SWFR X4 tubing can shrink more than twice as fast as standard products. This rapid shrinking may be important in the prevention of overheating of temperature-sensitive components.

Unlike other typical flame-retardant tubings, SWFR X4 tubing is halogen free.

SWFR X4 products are UL-recognized at 125°C, 300 V, and CSA-certified at 125°C, 300 V, with UL VW-1 and CSA OFT flame-retardancy ratings.

### Temperature rating

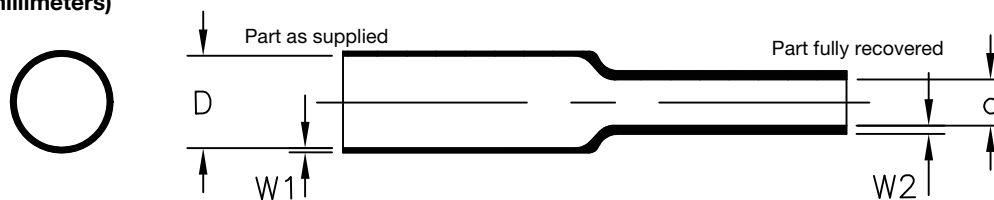
Minimum shrink temperature:	70°C
Full recovery temperature:	90°C
Continuous operating temperature:	- 30°C to 125°C

### Specifications\*

Type	Raychem	UL	CSA
SWFR X4	SWFR X4	E35586	LR31929

\*When ordering, always specify latest issue.

### Dimensions (millimeters)



Size	As supplied		Fully recovered		Size	As supplied		Fully recovered	
	D Inside diameter	W1 Wall thickness (nominal)	d (max.) Inside diameter	W (min.) Wall thickness**		D Inside diameter	W1 Wall thickness (nominal)	d (max.) Inside diameter	W (min.) Wall thickness**
0.6	0.95 ± 0.25	0.1	0.3	0.25	4.0	4.4 ± 0.25	0.15	2.0	0.28
0.8	1.2 ± 0.25	0.1	0.4	0.25	6.0	6.5 ± 0.4	0.15	3.0	0.33
1.0	1.4 ± 0.25	0.1	0.5	0.25	8.0	8.5 ± 0.4	0.15	4.0	0.33
1.5	1.9 ± 0.25	0.1	0.75	0.25	9.0	9.5 ± 0.4	0.15	4.5	0.33
2.0	2.3 ± 0.25	0.1	1.0	0.26	10.0	10.5 ± 0.5	0.15	5.0	0.33
2.5	2.8 ± 0.25	0.15	1.25	0.28	12.0	12.9 ± 0.5	0.15	6.0	0.33
3.0	3.3 ± 0.25	0.15	1.5	0.28	18.0	19.2 ± 0.6	0.2	9.0	0.46
3.5	3.8 ± 0.25	0.15	1.75	0.28	25.0	26.4 ± 1.0	0.2	12.5	0.46

\*\*Wall thickness will be less if tubing recovery is restricted during shrinkage.

### Ordering information

Colors	<b>Standard</b>	Black
Size selection	Always order the largest size that will shrink snugly over the component being covered.	
Standard packaging	On spools	
Marking	Marked (standard types, except size 0.6 is not marked).	UL, CSA, and Japan -F- Mark on labels.
Ordering description	Specify product name and size; for example, X4 2.0	

## Specification values

	Property	Unit	Requirement	Method of test
<b>Physical</b>	Dimensions	mm	See reverse	ASTM D 2671
	Longitudinal change			
	ASTM D 2671	percent	+1, -15	ASTM D 2671
	UL 224	percent	+3, -3	UL 224
	Eccentricity (recovered)	percent	30 maximum	ASTM D 2671
	Tensile strength	MPa ( <i>psi</i> )	10.3 (1500) minimum	ASTM D 2671
	Ultimate elongation	percent	200 minimum	ASTM D 2671
	Secant modulus (as supplied)	MPa ( <i>psi</i> )	103 (1.5 x 10 <sup>4</sup> ) maximum	ASTM D 2671
	Low-temperature flexibility (1 hour at -30°C/-22°F)		No cracking	UL 224
	Heat shock (4 hours at 250°C/482°F)		No cracking	UL 224
	Heat aging (7 days at 158°C/316°F)			UL 224
	Followed by tests for:			
	Tensile strength	MPa ( <i>psi</i> )	70% minimum of unaged specimens	UL 224
	Ultimate elongation	percent	100 minimum	UL 224
	Flexibility		No cracking	UL 224
	Dielectric withstand at 2500 V	seconds	60 minimum	ASTM D 2671
	Dielectric breakdown	volts	50% minimum of unaged specimens	ASTM D 2671
	Dielectric strength	kV/mm ( <i>volts/mil</i> )	19.7 (500) minimum	ASTM D 2671
	Restricted shrinkage		Pass	UL 224
<b>Electrical</b>	Dielectric withstand at 2500 V	seconds	60 minimum	ASTM D 2671
	Dielectric strength	kV/mm ( <i>volts/mil</i> )	19.7 (500) minimum	ASTM D 2671
	Volume resistivity	ohm-cm	10 <sup>14</sup> minimum	ASTM D 2671
<b>Chemical</b>	Corrosive effect (7 days at 158°C/316°F)		No corrosion	ASTM D 2671
	Copper stability (7 days at 158°C/316°F)		No brittleness, glazing, cracking, or severe discoloration of tubing. No pitting or blackening of copper.	ASTM D 2671
	Followed by test for:			
	Ultimate elongation	percent	100 minimum	ASTM D 2671
	Flammability		Pass	UL 224, VW-1

Note: Consult UL224 for specific details about test procedures.

**Users should independently evaluate the suitability of the product for their application.**

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